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Application Of The Green House Model To The U.s. Geriatric Veteran Population

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Abstract

U.S. Veterans have sacrificed to serve the nation and deserve excellence in care. The Green House concept is a culture change model, with a goal to change not only the physical setting for residents, but to also create an environment to improve holistic outcomes. There are only three states in the Veterans Affairs (VA) Administration that have adopted the Green House model for the geriatric Veteran population: Illinois, Alabama, and Wisconsin. This paper presents a synthesis of recent studies on Green House model implementation. This synthesis was then compared with the experience of three state VA Medical Centers' adoption of the model. In addition, VA Green House homes were assessed for their readiness to implement the change using a "Knowledge to Action framework." Studies reviewed were compared with the three states and found the same varied model implementations. However, implementing the Green House model has been found to have more benefits and minimal negative consequences. Implications for health care policy include the need to educate, support, and fund other VA facilities to build Green House homes for Veteran long-term care residents. Funding and support are needed to conduct research to determine improved resident outcomes, quality of life, and financial viability of the Green House homes for the U.S. Veteran population.

Application of the Green House Model to the U.S. Geriatric Veteran Population

The Veterans Affairs (VA) Administration is committed to providing long-term care services for the growing U.S. Veteran population, which is currently at 21.8 million (Census Bureau, 2015). In 2013, there were 8.9 million Veterans enrolled in the VA health care system and that number is predicted to increase. Costs of Veteran care are much higher than those associated with prior wars, in part because of enhanced survival, longer life spans, and more expensive diagnostic tools and treatments (Baker, 2014). The Armed Forces Veterans Homes Foundation has reported that there are approximately 10 million Veterans age 65 and older, resulting in demands exceeding the supply of quality long-term Veteran care (Senior Veterans Service Alliance, 2013). This paper presents a review of the literature on a long-term care innovation known as the Green House model and its integration into three VA Medical Centers (VAMC).

Background

The Veteran Nursing Home Deficit

There is at least one nursing home in each state to serve mostly low-income Veterans (Guide to Nursing Homes, 2010). These states are given a fixed amount per day per Veteran from the Veterans Affairs Administration (Ekstrand, 2006). Grants are often awarded for renovations to existing facilities or the construction of new Veterans' homes, with each state responsible for obtaining financing sources for the difference in cost of care and facility construction. However, the current demand for nursing home beds outstrips the supply. Hundreds of Veterans are turned away from the Nevada State Veterans Home in Boulder City because of insufficient facilities (Jaffe, 2014). Missouri's seven state nursing homes cannot accommodate the 2,000 Veterans on the waiting list for admission (Anderson, 2015). Florida

reports a high need for Veterans' nursing homes in three different regions (Florida Department of Veterans' Affairs, 2014). Manchester County, New Jersey, conducted research on its geriatric population and exposed a lack of any mechanism to support their growing Veteran population under the existing laws (Fressola, 2012). They also found that institution-based type of living conditions such as nursing homes are not favored by Veterans, who instead preferred smaller group homes. One example of a smaller nursing home model is the Green House (Green House Project, 2015).

The Green House Model

The Green House model is based on a philosophy of person-directed, relationship-based care (Green House Project, [GHP] 2015). The person-centered nursing framework enables residents to have a feeling of belonging and guides the nurses and the health care team to strengthen their professional competence, interpersonal skills, job commitment, and self-knowledge through their own values and beliefs (Li & Porock, 2013). It reflects a culture-change model, which benefit both the residents and the work environment of the staff (Koren, 2010). There are currently 185 Green House homes in 28 states and more are being built (GHP, 2015).

The Green House model usually consists of six to 12 older adults placed in deinstitutionalized long-term care (Sharkey, Hudak, Horn, James, & Howes, 2011). Most Green House homes measure 8,560 square feet with residents sharing the kitchen, dining room, and living room; nurses' stations and medication carts seen in traditional nursing homes are absent (Plunkett Raysich Architects, 2014). The homelike setting of the Green House enhances the holistic environment. While meals are prepared in the kitchen, the smell of the food stimulates the senses of the residents and they may participate in meal preparation if desired. The architecture of the homes incorporates ample windows and sunroofs to invite in natural light and

for the residents to enjoy seeing the view outside the home while relaxing in their chairs or simply enjoy the smell and touch of plants. Some homes use music, art, and pet therapies depending on the residents' recreational activity preferences.

Each Green House is staffed with a certified nursing assistant, who acts as caretaker of the home and is required to take additional training for culinary arts and other required tasks (GHP, 2015). Caretakers in the Green House model are called "*Shahbazim*," which comes from the Persian word *Shahbaz*, representing the important role of the royal falcon who watches over the elders (Rabig & Rabig, 2008). The Shahbazim are responsible for assisting the residents with their daily living activities, including laundry, cleaning, and meal preparations. The Shahbaz (singular) reports to the person accountable for providing support and resources to the health care team. The organizational structure of the Green House model has similarities to other interprofessional health care teams. However, more accountability is placed on the Shahbazim because they work closely with the residents, and the rest of the interprofessional team members are not always on the premises. In order to develop policy on the implementation of this model, it is important to synthesize the evidence on its use in practice.

Literature Review on the Green House Model

A comprehensive literature search of CINAHL, Cochrane, ProQuest, PolicyArchive, Ebsco, Medline, PubMed, and Google Scholar databases was conducted to explore evidence on the Green House model. Search terms used were "Green House Project," "elderly group homes," "person-centered care," "deinstitutionalization," and "Veterans Affairs Nursing Homes." Inclusion criteria were long-term care, elderly or geriatric population, and the Green House model. Exclusion criteria were pediatric, maternity, acute, and home care. A total of 37 studies were initially identified. Studies were systematically reviewed to identify the concept of the

Green House model and how it was further developed from the group-home models. Level and quality of research evidence were appraised and organized using a table of evidence. Overall strength and quality of evidence (Figure 1) were synthesized and summarized. In all, 14 studies were included in the review (Table 1).

Since the first Green House home started in 2003, researchers have studied differences and outcomes of the model compared to traditional nursing homes (GHP, 2015). Variables examined across the studies included in this review of literature included: 1) quality measures and hospital readmissions, 2) psychosocial and physical health outcomes, 3) staff empowerment, satisfaction, productivity, and turnover, 4) model implementation and leadership support, 5) quality of life, resident and family satisfaction, and 6) financial performance and environmental costs. Legacy nursing homes are defined as traditional nursing homes next to Green House homes and owned by the same organization (Afendulis, Caudry, O'Malley, Kemper & Grabowski, 2016).

Quality Measures and Hospital Readmissions

Quality measures include the minimum data set (MDS), a mandated assessment report by Medicare and Medicaid certified nursing home facilities (Townsend & Davis, 2010). Afendulis et al. (2016) used quality measures of bedfast, incontinence, catheterization, pain, physical restraints, pressure ulcers, and urinary tract infection. They found a 15.8% decline in bedfast residents, a 45% decline in catheterized residents, and a 38% decline in low-risk residents with pressure ulcers in the Green House residents, all of which are significant differences compared to traditional nursing homes. Improved communication was linked with decreased hospital transfers through effective clinical decisions (Bowers, Roberts, Nolet & Ryther, 2016). Afendulis et al. (2016) also compared hospitalization and rehospitalization rates in Green House homes with

traditional nursing homes. Green House homes had a 5.5% decline in all 30-day readmissions and a 3.9% decline in avoidable readmissions. Comparatively, Grabowski et al. (2016) found that Green House home utilization had fewer skilled nursing facility days compared to traditional nursing homes.

Psychosocial and Physical Health Outcomes

There were no significant differences in physical health outcomes in any of the Green House models in the following three studies. Hill, Kolanowski, Milone-Nuzzo and Yevchack (2011) found that, even when health outcomes were inconsistent, studies demonstrated potential psychosocial benefits in resident autonomy and self-rated quality of life. Kane, Lum, Cutler, Degenholtz, and Yu (2007) combined resident survey and MDS data and found that Green House residents had higher quality of life scores, but no differences in health or activities of daily living. Similarly, Yoon, Brown, Bowers, Sharkey, and Horn (2015) found no significant differences in activities of daily living function compared to traditional nursing homes.

Staff Empowerment, Satisfaction, Productivity, and Turnover

Several qualitative studies examined staff empowerment and satisfaction (Brown et al., 2016; Bowers & Nolet, 2011). There were lower turnover rates ($p < .05$) in Green House homes than traditional nursing homes. Although there were variations in model implementation, there were high levels of consistency in feelings of staff empowerment (Bowers & Nolet). Older caregivers in Green House homes provided twice the number of care hours and trended toward lower staff turnover rates (Brown et al, 2016). Similarly, Sharkey et al. (2011) found approximately 0.3 fewer hours total staffing per resident days were found in Green House homes than traditional skilled nursing facilities.

Model Implementation and Leadership Support

Data on Green House model implementation revealed inconsistent findings because some homes modified the use of specialized workers, such as cooks to perform certain tasks, and variation in practices regarding resident choices and decisions (Cohen et al., 2016). Leadership and clinical decision-making also varied in implementation because some Green House homes maximized communication and collaboration within the model, resulting in lower hospital transfer rates, whereas those homes that did not do so had higher transfer rates (Bowers et al., 2016). Leadership responses to situations may improve or undermine the decision-making of direct caregivers resulting in reinforcement or erosion in sustaining the Green House principles and practices (Bowers, Nolet & Jacobson, 2016).

Quality of Life, Resident and Family Satisfaction

Cohen et al., (2016) found inconsistent quality indicators on residents' meaningful life (defined as having autonomy and control); this was perceived to be due to variations in practices within each facility. However, another study found overall resident satisfaction and quality of life scores in the Green House homes were higher than those scores in traditional nursing homes (Kane et al., 2007). Additionally, Lum et al., (2009) found improved outcomes for family members on experience, satisfaction, and involvement. The Shahbazim's expanded responsibilities and interactions led to perceived better quality of care by residents and their families as well as higher satisfaction than with care received in the traditional nursing homes. Specifically cited were consistency of staff assignments that got to know residents and families well.

Financial Performance and Environmental Costs

The operational costs of direct staffing in Green House homes were comparable to those in traditional nursing homes and capital costs were equivalent or less than those of traditional nursing homes that adopted other culture change models (Jenkens, Sult, Lessell, Hammer & Ortigara, 2011). However, the total operating costs per resident day in Green House homes were 1% higher than the national median value in traditional nursing homes, mainly due to increased square foot requirements (Jenkens et al.). Overall, annual Medicare Part A spending was reduced by $7,746 in the Green House model, which was partially offset by increased spending in legacy homes (Grabowski et al., 2016).

In summary, the studies showed inconsistent findings on model implementation and these may have contributed to variances in outcomes. There were better outcomes on hospital readmissions, satisfaction, psychosocial benefits, financial indicators, workforce issues, staff empowerment, and in some studies, quality of life, compared to traditional homes. In general there were minimal negative consequences.

Green House Model and the U.S. Veteran Population

Three states with VAMCs have implemented the Green House Project™. The first VAMC Green House homes were implemented in Danville, Illinois (VA Illiana Health Care System, 2011). Currently, there are two homes operating at the VA Illiana, plus two in construction and two in design. These six homes will be able to serve a total of 60 Veterans. Four homes have opened in North Chicago under the management of the Captain James A. Lovell Federal Health Care Center. A second set of VAMC Green House homes is in Tuscaloosa, Alabama, where one home is specifically designated for Vietnam Veterans, and 12 more houses are to be constructed (GHP, 2015). The third and most recent set of Green House homes opened

in Wisconsin in September 2014 under the Tomah VAMC. One of these homes focuses specifically on serving Veterans with active mental health problems (GHP). This section will discuss the implementation of the Green House homes in these three VAMCs using a framework to understand organizational readiness for change.

The Knowledge to Action conceptual framework provides a structure to understand organizational readiness for change (Graham, et al., 2006). The process starts with knowledge creation. The organization hones the new knowledge through inquiry, synthesis, and the use of knowledge tools and products. Knowledge inquiries are generated to determine the fit of new knowledge and how it could be used for organizational change. The second process is knowledge synthesis, in which available research is examined to determine its relevance to specific questions about organizational change. The third process determines the applicability of knowledge tools and products for dissemination of the information. The knowledge gained from these processes is then evaluated for implementation into action.

Implementation planning occurs in the action cycle (Graham, et al., 2006). The organization identifies problems and then adapts knowledge to local contexts to determine its feasibility, including barriers. During the actual implementation, the process and outcomes must be monitored to determine if there is a need for revision or sustainment. The extent of an organization's readiness will determine whether personnel are physically and psychologically ready to implement the needed changes (Weiner, Amick, & Lee, 2008).

Leaders from the three VAMCs that have implemented the Green House model for their Veteran residents were interviewed about their experiences. The Knowledge to Action framework was used to determine the inquiry and to explore facilitators and barriers to implementation of change in long-term Veteran care settings.

The Illiana VAMC in Illinois and Tomah VAMC in Wisconsin were visited to discuss how nursing leaders implemented the Green House model in their setting. Table 2 provides the questions that guided the discussion. The Tuscaloosa VAMC Alabama leader was interviewed via phone and e-mail exchanges. The three VAMCs had similarities and differences in their evaluation of the need to implement the Green House homes for their geriatric residents, but all agreed that it would enhance the Veterans' quality of life.

During the inquiry and synthesis cycle, the three VAMCs considered the Eden Alternative model (Eden Alternative, 2015). The holistic approach to transformational change or HATCH was the national model of care chosen by the VA Central Office (National Demonstration Project, 2010). However, a change in the physical environment was needed to maximize the cultural transformation, so all three VAMCs decided to adopt the Green House model of care. A change was needed to shift from the physical environment of a traditional nursing home, which the VAMC calls a community living center or CLC, to resident-centered care through small group homes. Multiple services were involved in deciding to make these changes and implement the new model of care. Illinois took approximately 4 years from inception to implementation of the Green House model as the leader in implementation. Alabama took approximately 14 months and Wisconsin about 18 months.

The Green House conceptual model was identified in the action cycle as a barrier. In Alabama, changing the management structure was the most significant barrier. In Illinois and Wisconsin, the need to adhere to Centers for Medicare & Medicaid Services (CMS) standards for long-term care was a challenge. For example, the physical environmental designs needed to adhere to the CMS standards of the life safety code, which required a change in the fire hood design. The implementation stage became difficult at the Wisconsin facility because some

stakeholders involved in decision-making had no experience in long-term care management. Other challenges identified in Illinois were both leadership and staff buy-in, which was addressed through weekly or monthly conference calls. There were times when the Central VA Office in Washington, DC was involved in leadership meetings to determine solutions and receive confirmation of approval.

All three VAMCs identified positive staff responses to the new model as facilitators and believed the changes resulted in staff satisfaction. They noted that Veterans were pleased with their care when the new model was implemented. Each resident room was decorated to Veterans' preferences so they were proud to show them to visitors. The small homes required staffing by one RN and two Shahbazim 24 hours a day, 7 days a week. However, the three VAMCs varied with staffing depending on need. For example, some facilities needed two RNs and three or four Shahbazim during the day, based on size and acuity. The ratio of staff to residents contributes to holistic care because of close working relationships, continuity of care, and development of trust. As a result, some residents become protective of their environment and may question any new staff working in their home. Additional feedback indicated that residents were pleased with their level of involvement in menu planning and actual food preparation.

There is no planned research at this time in the three VAMC Green House homes to determine differences in resident outcomes since their adoption. However, Illinois found that costs of Green House homes are approximately $80 less per bed days of care compared to costs of the CLCs. This was perceived to be due to the flattened organizational processes that eliminate the need for a charge nurse, and the Shahbazim replacing the dietary, personal laundry, and some housekeeping staff. Furthermore, the empowerment experienced by the Shahbazim has provided consistency in staffing, leading to decreased staff turnover compared to CLCs. The

Illinois facility conducts annual evaluations of the model and its impact on Veterans, family, and staff on quality and cost effectiveness. The focus is on living and caring, rather than healing and curing. Additionally, numerous standard operating procedures in Illinois have been developed to manage the differences between CLCs and Green House homes. Staff members also participate in Green House annual conferences. Alabama and Wisconsin do not have data at this time to determine whether they have results similar to Illinois on differences of per bed days costs between CLCs and the Green House homes.

The current process for sustainability in Illinois is implementation of a formalized process in collaboration with the Green House Project ™ to bring the Green House principles and concepts to the CLCs. They have created a statement of work to integrate principles and concepts of the Green House model into the current CLC to prepare residents and staff for eventual transition to newly constructed Green House homes. There is no formal process for sustainability in Wisconsin other than ongoing feedback from staff, Veterans, and their families. Alabama has no sustainability plan at this point.

All three states noted that more Veterans are interested in living in the Green House environment as more homes are being constructed. Originally, there was an early admission policy that current residents living in CLCs would have priority for admission in the Green House homes; these have been revised to make them available to all eligible Veterans whose benefits are 70% service connected and require skilled care. Similar to traditional nursing homes, the Veteran must meet long-term care criteria; no other requirements need to be met for Green House admission, even if they require total care. Reimbursement costs are received from VA funds.

There are differences in the lessons learned by the three states. Wisconsin noted the need for better planning by stakeholders earlier in the process. Alabama learned that involving the staff more in the planning process would be beneficial for staff empowerment. Illinois stakeholders recommended that some leaders and providers receive more training before transitioning from a traditional nursing home to the Green House model. Wisconsin and Illinois suggested that working with administration and human resources to allow staff to alter schedules after they are posted in the national payroll system to enhance staff satisfaction. Wisconsin also recommended that the staff be allowed to eat the food cooked in the home so they can have quality meals with the residents. Finally, Illinois recommended increased support for culture change at the national VA level, including the assumption of some risk to Veterans by allowing independent decisions (e.g. going outside when it is cold) to provide an increased quality of life.

All three VAMCs used most of the steps in the Knowledge to Action framework (Graham, et al., 2006). They identified the need to change the environment, adapted knowledge, and implemented interventions. Barrier assessments in knowledge use could be improved to decrease challenges in implementations. Alabama and Wisconsin would need to monitor the process. Process improvement will benefit all three VAMCs through the use of continuous evaluation and sustainment phase of the framework.

Implications for Policy, Practice, and Future Research

The future of health care should include innovations to improve the environment, structure, and a model of care with a philosophy that promotes holistic care for Veterans. Variations in VAMCs' Green House home implementations have similar findings from recent studies on the model. Adoption of the Green House model has received positive responses from Veterans, their families, and staff. At this time, there is no current policy for all the long-term

care VAMC facilities to adopt the Green House model. The initiatives of the Illinois, Wisconsin, and Alabama VAMCs were independent decisions made by long-term care leaders and supported by the director of each facility, who then received funding authorization to construct the homes. Therefore, it is recommended that other VAMC leaders and directors examine their options and assess the feasibility of moving from a traditional nursing home to the Green House model. The lessons learned from the three VAMC Green House homes should serve as resources to other VAMCs to determine organizational readiness and sustainability processes in adopting the new model.

The Green House model is not exclusive to the geriatric population and may also apply for other Veterans in need of long-term care with specific health care problems. For example, the Clement J. Zablocki VA Medical Center in Milwaukee is planning a Green House home specifically for Veterans with spinal cord injuries (Ballenstedt, 2014). Furthermore, the VA Illiana plans one Green House home for Veterans with short stay skilled care needs. The model may have specific application long-term plans for Veterans who have served in recent conflicts such as the Iraq and Afghanistan wars. Implications for health care policy include the need to educate, support, and fund other VAMC facilities to build Green House homes for long-term care. The majority of research on the Green House model has not included the Veteran population. Thus, more funding and support are needed to conduct research to determine improved resident outcomes, quality of life, and financial viability specific to Veteran populations cared for in Green House homes compared to traditional nursing homes.

Conclusion

Current evidence suggests that there are health, workforce, and cost advantages in adopting the Green House model. Alabama, Illinois, and Wisconsin VAMC have paved the way

in initiative and leadership to improve long-term care services to Veterans with this unique model, and such successes may inspire other states to do the same. It is essential to enlist the enthusiasm of senior administrators and policymakers at state and national levels to support adoption of the Green House model to improve Veteran services. U.S. Veterans have sacrificed to serve the nation. Let us serve them in return by providing excellence in care and the highest quality of life.

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Table 1. Evidence for the Green House Model

Study	Design Method Level of Evidence	Sample Setting	Major Variables Studied	Data Collection Measurement	Data Analysis	Findings	Strengths and Limitations
Afendulis, C.C., Caudry, D.J., O'Malley, A.J., Kemper, P & Grabowski, D.C. (2016). Green House adoption and nursing home quality.	Matched control study, compared GH with traditional nursing homes Level III	15 Green House (GH) homes matched to matched traditional homes	Hospitaliza-tions and MDS quality measures	Minimum Data Set (MDS) Online Survey, Certification, and Reporting file (OSCAR) Medicare enrollment and claims data	Logistic regression Holm-Bonferroni	Lower 30-day readmissions & decline in avoidable readmissions; improved quality measures in GH homes	Strength: multiple data sets, research design, quality measures, pre-post comparison Limitations: statistical imprecision, lack of control for unobserved variables.
Bowers, B. & Nolet, K. (2011). Empowering direct care workers: Lessons learned from The Green House model.	Qualitative grounded theory Level VI	116 direct care workers, licensed staff, & directors in14 GH homes	Empower-ment of staff Meaning, challenges, & benefits,	Interviews	Grounded dimension-nal analysis	Variations in implementa-tion of model & staff empowerment, but higher levels of consistency in feelings of empowerment	Strength: focus on direct care staff empowerment. Limitation: study was not longitudinal and researchers were not immersed in the settings
Bowers, B., Roberts, T., Nolet, K. & Ryther, B. (2016). Inside the Green House "Black Box":	Qualitative grounded theory Level VI	84 nurses, Shahbazim, department directors, physician, and nurse practitioners	Responses & communica-tion on early changes in residents' condition, hospital	Interviews	Dimensio-nal analysis and open, axial, selective coding	Decreased hospital transfers through clinical decision-making	Strength: addressed the inconsistencies found in past research on the care outcomes. Limitation:

Study	Design Method Level of Evidence	Sample Setting	Major Variables Studied	Data Collection Measurement	Data Analysis	Findings	Strengths and Limitations
Opportunities for high-quality clinical decision making.		in GH homes	transfers			elements of the GH model help identify, communicate, and respond to early changes in resident's condition	reliance on participant report
Bowers, B., Nolet, K. & Jacobson, N. (2016). Sustaining culture change: Experiences in the Green House model..	Qualitative grounded theory, Level VI	166 staff of 11 GHs	Patterns of problem solving, leadership support, nature of problems, competition for workers, regulation, and erosion	Interviews	Dimensio-nal analysis	Collaboration on problem solving sustained GH principles and practices with some variations	Strength: observation of house meetings and daily operations that led to examination of major variables reinforcing or eroding sustainability. Limitation: inability to generalize findings to other culture change models
Brown, P. B., Hudak, S. L., Horn, S. D., Cohen, L. W., Reed, D. A. & Zimmerman, S.	Observa-tional study Level V	13 GH and 8 comparison settings in 11 states	Work stress, safety perceptions, satisfaction, staff hours per resident	Human resource workforce data survey, Work Stress Inventory	Wilcoxon tests, *t*-tests, ANOVA, Kruskal – Wallis tests,	Older GH direct caregivers provided 2x care hours compared to	Strength: various workforce characteristics and national survey use.

Study	Design Method Level of Evidence	Sample Setting	Major Variables Studied	Data Collection Measurement	Data Analysis	Findings	Strengths and Limitations
(2016). Workforce characteristics, perceptions, stress, and satisfaction among staff in Green House and other nursing homes.			day, turnover, culture, and comparison with national data	Nursing Home Survey on Patient Safety Culture (AHRQ), National Nursing Assistant Survey	chi-square, & Fisher exact tests	other settings; trend toward lower staff turnover No difference in work stress, safety perceptions, or satisfaction	Limitation: small sample size and low survey response rate.
Cohen, L.W., Zimmerman, S., Reed, D., Brown, P., Bowers, B.J., Nolet, K., Hudak, S. & Horn, S. (2016). The Green House model of nursing home care in design and implementation.	Qualitative cross-sectional study, Level VI	12 GH and legacy nursing homes	Difference in GH & legacy environment design, meaningful life, resident control & decision making, staff engagement and work teams, financial & clinical services, national & state comparison	Semi-structured interviews and minimum data set (MDS), Policy and Program Information Form (POLIF)	Wilcoxon-signed ranks tests, binary categorical data using McNemar tests. Qualitative content analysis	Variations in model implementa-tion on resident choice, decision-making, staff engagement & work teams. Inconsistent quality indicators on meaningful life. No difference in financial & clinical services per resident day	Strength: multiple data sets using MDS data with interviews. Limitation: small sample size.

Study	Design Method Level of Evidence	Sample Setting	Major Variables Studied	Data Collection Measurement	Data Analysis	Findings	Strengths and Limitations
						for licensed nursing staff but higher direct caregiver total care hours per resident days	
Grabowski, D.C., Afendulis, C.C., Caudry, D.J., O'Malley, A.J. & Kemper, P. (2016). The impact of Green House adoption on Medicare spending and utilization.	Correla-tional study, Level IV	15 in 223 matched traditional nursing homes	Pre-post difference in spending and utilization, and overall Medicare Part A spending per quarter	Minimum Data Set (MDS); Online Survey, Certification, and Reporting file (OSCAR); and beneficiary-level Medicare enrollment and claims data	Regression model, bootstrapping methods, Huber-White robust standard errors	Reduced overall annual Medicare Part A spending in GH model by $7,746 partially offset by increased spending in legacy homes	Strength: mixed methods, pre & post difference in Medicare utilization. Limitations: low statistical precision and only analyzed Medicare Part A, some data have missing identifiers, and varied implementation in GH sustainability
Hill, N. L., Kolanowski, A. M., Milone-Nuzzo, P., & Yevchack, A. (2011). Culture change models and resident	Integrated review Level V	11 studies on GH model culture change	Psychosocial and physical health outcomes	Prior research rated with Scottish Intercollegiate Guidelines Network	Literature synthesis	Inconsistencies in health outcomes, but with potential psychosocial benefits	Strength: comparison of culture change models. Limitation: no higher grade of evidence study

Study	Design Method Level of Evidence	Sample Setting	Major Variables Studied	Data Collection Measurement	Data Analysis	Findings	Strengths and Limitations
health outcomes in long-term care.							found
Jenkens, R., Sult, T., Lessell, N., Hammer, D., & Ortigara, A. (2011). Financial implications of The Green House Model.	Case study Level IV	5 GHs and 2 traditional nursing homes	Financial performance, staffing and administra-tion, costs, benchmarks	Intensive case study approach	Data comparison across sites	GH operational costs comparable to traditional nursing homes. Capital costs equivalent or less than similar culture change models. Total operating costs per resident day 1% > than median value in traditional nursing homes	Strength: examination of financial performance. Limitation: small sample size.
Kane, R. A., Lum, T. Y., Cutler, L. J., Degenholtz, H. B., & Yu, T. (2007). Resident outcomes in small-house nursing homes: A longitudinal	Longitudi-nal quasi-experimen al study Level III	40 GH residents, and 80 residents from two traditional nursing homes	Quality of life, emotional well-being, satisfaction, self-reported health, and functional status,	MDS data	Chi-square tests, Tobit regression analyses, random-effects analyses	GH - higher quality of life scores, emotional well-being & satisfaction No differences in health or activities of	Strength: longitudinal evaluation. Limitation: small sample size & risk of Hawthorne effect.

Study	Design Method Level of Evidence	Sample Setting	Major Variables Studied	Data Collection Measurement	Data Analysis	Findings	Strengths and Limitations
evaluation of the initial Green House program						daily living	
Lum, T. Y., Kane, R.A., Cutler, L. J., Yu, T. (2009). Effects of Green House nursing homes on residents' families.	Longitudinal quasi-experimental study, Level III	40 GH family members 80 family members from two traditional nursing homes	Satisfaction with resident care, experience, assistance, burden	Survey data; 1-5 Likert scale	Multivariate regression analyses, random-effects Tobit regression models or ordered Probit models	GH - improved outcomes for family members on experience, satisfaction, involvement	Strength: longitudinal quasi-experimental study. Limitation: reliance on family member feedback.
Sharkey, S., Hudak, S., Horn, S. D., James, B., & Howes, J. (2011). Frontline caregiver daily practices: A comparison study of traditional nursing homes and the Green House project	Cohort study Level IV	240 staff from 27 participating sites	Organization, resident characteristics, staffing, non-nursing department support, direct and indirect care activities	Observational, interviews, and surveys. Organizational characteristics frequencies computed through surveys. Resident characteristics computed for CMS Resident Census & Conditions of	Two-sample Wilcoxon test, Fisher exact test, and Chi-square	GH decreased staffing hours per resident days compared to traditional nursing homes without negatively affecting time spent with resident care No difference in organizational	Strength: examination of organization, care activities, and staffing. Limitation: only 8 to 10 hours of data on direct observation and remaining hours relied on staff providing the data

Study	Design Method Level of Evidence	Sample Setting	Major Variables Studied	Data Collection Measurement	Data Analysis	Findings	Strengths and Limitations
sites.				Residents form item. Labor hours computed for all 3 shifts		& resident characteristics	
Yoon, J.Y., Brown, R.L., Bowers, B.J., Sharkey, S.S. & Horn, S.D. (2015). The effects of the Green House nursing home model on ADL function trajectory: A retrospective longitudinal study.	Retrospective longitudinal study, Level IV	93 GH & 149 traditional nursing homes residents	Effect of the GH on ADL function change over time and trajectories	ADL long-form scale	Pattern-mixture model, growth curve modeling, growth mixture modeling, and latent growth curve modeling	GH - no significant differences in ADL function compared to traditional nursing homes	Strength: longitudinal study. Limitations: selection bias and questionable MDS data accuracy.
Zimmerman, S., Bowers, B. J., Cohen, L.W., Grabowski, D. C., Horn, S. D. & Kemper, P. (2016). New evidence on the Green House model of nursing home	Clinical integration & interpre-tation of findings, Level V	2011-2014 data from28 GH homes, 15 traditional nursing 2005-2010 72 GH homes from 15 organiza-	Interpretation of findings of the studies with same or varied results	Minimum Data Set (MDS); Online Survey, Certification, and Reporting file (OSCAR); and beneficiary-level Medicare enrollment and claims data	Comparison of studies	GH adoption lowers hospital readmissions, 3 MDS measures of poor quality, and Part A/hospice Medicare expenditures,	Strength: integration and interpretation of findings for 9 years in various GH homes and traditional nursing homes. Limitation: low statistical power

Study	Design Method Level of Evidence	Sample Setting	Major Variables Studied	Data Collection Measurement	Data Analysis	Findings	Strengths and Limitations
care: Synthesis of findings and implications for policy, practice, and research.		tions and 223 comparison homes				may be associated with lower staff turnover.	in the studies

Figure 1. Levels of Evidence

Level I	Systematic Review Meta-Analysis Evidence-Based Guideline
Level II	Randomized Control Trial (RCT)
Level III	Controlled Trial Without Randomization (Quasi-experimental Study)
Level IV	Non-Experimental Study Case Control, Cohort or Correlational
Level V	Systematic Review of Descriptive/Qualitative Studies
Level VI	Descriptive/Qualitative Study
Level VII	Opinion of Authorities Expert Committee Report

Source:

LoBiondo-Wood, G.P., & Haber, J. (2014). *Nursing research: Methods and critical appraisal for evidence-based practice* (8th ed.). St. Louis, MO: Mosby Elsevier.

Table 2. Discussion questions with VAMC Green House leaders

1. There are only three states that implemented the Green Houses to serve our Veteran population. What prompted this organization to inquire about the change in long-term care? Who initiated the request for change?
2. What other models of change were considered? How did you make your decision?
3. Who were the people involved in deciding about making this change and in implementing it?
4. How long did the process take to proceed with the change?
5. After the approval of the change, what were your next steps; how were those communicated?
6. What were the problems and barriers identified?
7. How did the organization plan and implement the change?
8. What challenges did you encounter? How were they resolved?
9. How did the staff respond to the new model?
10. How did the Veterans react to this new model of care? What were their feedbacks?
11. What are the current processes to sustain and improve this new model of care?
12. Do you have an ongoing evaluation of the model and its impact on veterans, family, quality, staff, and cost-effectiveness?
13. Now that the new VA Green Houses are in operation, were there any other processes that you think should have been added to this new model of care? What do you think could have been done differently?
14. Since the opening of the VA Green Houses, did the organization receive more applications for Veteran residency? Do you think this is a better model that will benefit the veterans compared to the use of medical foster homes?
15. What were the lessons learned during this whole process to help other VA facilities implement the same change?
16. Considering the challenges and barriers the organization experienced in the implementation of this new model of care, what are your recommendations for future policy changes that will benefit other VA facilities and the Veteran population they serve?
17. There are only three states that implemented the Green Houses to serve our Veteran population. What prompted this organization to inquire about the change in long-term care? Who initiated the request for change?
18. What other models of change were considered? How did you make your decision?
19. Who were the people involved in deciding about making this change and in implementing it?

20. How long did the process take to proceed with the change?
21. After the approval of the change, what were your next steps; how were those communicated?
22. What were the problems and barriers identified?
23. How did the organization plan and implement the change?
24. What challenges did you encounter? How were they resolved?
25. How did the staff respond to the new model?
26. How did the Veterans react to this new model of care? What were their feedbacks?
27. What are the current processes to sustain and improve this new model of care?
28. Do you have an ongoing evaluation of the model and its impact on veterans, family, quality, staff, and cost-effectiveness?
29. Now that the new VA Green Houses are in operation, were there any other processes that you think should have been added to this new model of care? What do you think could have been done differently?
30. Since the opening of the VA Green Houses, did the organization receive more applications for Veteran residency? Do you think this is a better model that will benefit the veterans compared to the use of medical foster homes?
31. What were the lessons learned during this whole process to help other VA facilities implement the same change?
32. Considering the challenges and barriers the organization experienced in the implementation of this new model of care, what are your recommendations for future policy changes that will benefit other VA facilities and the Veteran population they serve?